

Application No. 09/830,778
Amendment dated April 9, 2004
Page 3

Amendments to the Claims:

The following claims will replace all prior versions of the claims in this application (in the unlikely event that no claims follow herein, the previously pending claims will remain):

1. (Previously presented) A detonator comprising:
 - (i) a hollow detonator shell having an open end and a closed end;
 - (ii) an igniting device at the open end of said hollow detonator shell;
 - (iii) optionally a delay element adjacent said igniting device;
 - (iv) an initiating element comprising an initiation portion and optionally a transition portion; and
 - (v) optionally a base charge;wherein said initiation portion is at least partially contained within a confinement sleeve and comprises an intimate mixture of a relatively large particle size, porous, powdered explosive having interstitial spaces, and a relatively small particle size, high burn-rate pressurising initiator located within said interstitial spaces.
2. (Original) A detonator as claimed in Claim 1 wherein said porous powdered explosive comprises PETN, RDX, HMX, Tetryl, TNT or a mixture thereof.
3. (Original) A detonator as claimed in Claim 2 wherein said porous powdered explosive comprises PETN.
4. (Original) A detonator as claimed in Claim 3 wherein said PETN has a number average particle size of greater than 100 microns.
5. (Original) A detonator as claimed in Claim 1 wherein said high burn-rate pressurising initiator is selected from the group consisting of potassium picrate, potassium styphnate, lead styphnate, potassium trinitrobenzoate, alkali or alkaline earth metal salts of nitro-aromatic compounds, and mixtures thereof.

Application No. 09/830,778
 Amendment dated April 9, 2004
 Page 4

6. (Previously presented) A detonator as claimed in Claim 1 wherein said high burn-rate pressurising initiator is potassium picrate.
7. (Original) A detonator as claimed in Claim 1 wherein said high burn-rate pressurising initiator comprises a mixture of two separate components, namely a material having a high burn rate at low pressure and an oxidizer.
8. (Original) A detonator as claimed in Claim 7 wherein said oxidizer comprises potassium perchlorate or ammonium perchlorate.
9. (Original) A detonator as claimed in Claim 8 wherein said oxidizer comprises potassium perchlorate.
10. (Previously presented) A detonator as claimed in Claim 1 wherein said initiation portion comprises between 5 and 15% by weight of an oxidizer and between 5 and 15% by weight of a material having a high burn rate at low pressure, which together form said high burn-rate pressurising initiator, and 70 to 90% by weight of said porous powdered explosive.
11. (Original) A detonator as claimed in Claim 1 wherein said transition portion comprises PETN, RDX, HMX, Tetryl or a mixture thereof.
12. (Original) A detonator as claimed in Claim 11 wherein said transition portion comprises PETN.
13. (Original) A detonator as claimed in Claim 12 wherein said PETN is pressed to a density of between 1.0 and 1.2g/cc.
14. (Original) A detonator as claimed in Claim 1 wherein said confinement sleeve is a steel, copper or stainless steel sleeve.

30444171v1

Application No. 09/830,778
Amendment dated April 9, 2004
Page 5

15. (Original) A detonator as claimed in Claim 14 wherein said confinement sleeve is a circular sleeve having a wall thickness of between 0.1 and 1.5mm.
16. (Original) A detonator as claimed in Claim 1 wherein said initiation portion comprises a mixture of 5 to 15% by weight potassium picrate having a number average particle size of less than 10 microns, 5 to 15% by weight potassium perchlorate having a particle size of less than 10 microns, and 70 to 90% by weight PETN having a particle size of greater than 100 microns, and wherein said initiation portion has been pressed into a confinement sleeve so as to have a density of between 1.2 and 1.5g/cc.
17. (Original) A detonator as claimed in Claim 16 wherein said transition portion comprises PETN having a particle size of greater than 100 microns and has been pressed into a confinement sleeve so as to have a density of between 1.0 and 1.2g/cc.
18. (Original) A detonator as claimed in Claim 1 wherein said initiation portion comprises additional components selected from the group consisting of explosives, propellants, gas-generating compounds, organic fuels, binders and combinations thereof.
19. (Currently amended) A detonator as claimed in Claim 1 wherein said igniting device comprises a flame and/or shock wave from an electric match, bridge wire, safety fuse, detonating cord or a shock tube which is inserted into the open end of the hollow detonator shell.
20. (Withdrawn) A detonator as claimed in Claim 1 wherein said detonator comprises an electronic detonator.
21. (Original) A detonator as claimed in Claim 1 which is essentially free of added primary explosives.
22. (Original) A detonator as claimed in Claim 1 comprising a delay element adjacent said igniting device, so as to form a delay detonator.

30444171v1

Application No. 09/830,778
Amendment dated April 9, 2004
Page 6

23. (Original) A detonator as claimed in Claim 1 wherein said detonator is impact resistant.

24. (Original) A detonator as claimed in Claim 1 wherein said detonator is propagation resistant.

25. (Previously presented) An in-hole detonator comprising:

- (i) a hollow detonator shell having an open end and a closed end;
- (ii) an igniting device at the open end of said hollow detonator shell;
- (iii) optionally a delay element adjacent said igniting device;
- (iv) an initiating element comprising an initiation portion adjacent said delay element or said igniting device, and optionally a transition portion; and
- (v) a base charge,

wherein said initiation portion is at least partially contained within a confinement sleeve and comprises an intimate mixture of a relatively large particle size, porous, powdered explosive having interstitial spaces, and a relatively small particle size, high burn-rate pressurising initiator located within said interstitial spaces.

26. (Withdrawn) A surface detonator comprising:

- (i) a hollow detonator shell having an open end and a closed end;
- (ii) an igniting device at the open end of said shell;
- (iii) optionally a delay element adjacent said igniting device; and
- (iv) an initiating element comprising an initiation portion adjacent said delay element or said igniting device, and optionally a transition portion,

characterized in that said initiation portion is at least partially contained within a confinement sleeve and comprises an intimate mixture of a relatively large particle size, porous, powdered explosive having interstitial spaces, and a relatively small particle size, high burn-rate pressurising initiator located within said interstitial spaces.

Applicanon No. 09/830,778
Amendment dated April 9, 2004
Page 7

27. (Withdrawn) A surface detonator comprising:

- (i) a hollow detonator shell having an open end and a closed end;
- (ii) an igniting device at the open end of said shell;
- (iii) optionally a delay element adjacent said igniting device; and
- (iv) an initiating element comprising an initiating portion adjacent said delay element or said igniting device,

characterized in that said initiation portion is at least partially contained within a confinement sleeve and comprises an intimate mixture of a relatively large particle size, porous, powdered explosive having interstitial spaces, and a relatively small particle size, high burn-rate pressurising initiator located within said interstitial spaces, and wherein said initiation portion achieves only a low order detonation.

28 (Withdrawn) A surface detonator as claimed in Claim 26 or 27 wherein said detonator additionally comprises a base charge, and wherein the shock wave produced by said base charge is reduced by using a diluted base charge or a low density base charge

29. (Original) An initiating element for use in a detonator comprising an initiation portion and optionally a transition portion wherein said initiation portion is at least partially contained within a confinement sleeve and comprises an intimate mixture of a relatively large particle size, porous, powdered explosive having interstitial spaces, and a relatively small particle size, high burn-rate pressurising initiator located within said interstitial spaces.

30. (Previously presented) A process for manufacturing a detonator as claimed in Claim 1 comprising, in order:

- (i) optionally inserting a base charge into a hollow detonator shell;
- (ii) inserting an initiating element comprising an initiation portion and optionally, a transition portion, into said hollow detonator shell;
- (iii) optionally inserting a delay element into said hollow detonator shell; and
- (iv) inserting an igniting device into said hollow detonator shell;

wherein all components are operationally adjacent each other, and wherein said initiation portion comprises an intimate mixture of a relatively large particle size, porous powdered

30444171v1

Application No. 09/830,778
Amendment dated April 9, 2004
Page 8

explosive having interstitial spaces, and a relatively small particle size, high burn-rate pressurising initiator located within said interstitial spaces.

31. (Original) A process as claimed in Claim 30 additionally comprising the step of granulating the initiation portion.
32. (Original) A process as claimed in Claim 31 wherein said initiation portion is combined with a granulating agent prior to granulation.
33. (Original) A method of blasting comprising initiation of an explosive charge utilising at least one detonator, wherein the at least one detonator is as claimed in Claim 1.
34. (Original) A composition suitable for use in an explosive detonator, the composition comprising an intimate mixture of a relatively large particle size, porous, powdered explosive having interstitial spaces, and a relatively small particle size high burn rate pressurising initiator located within said interstitial spaces.